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ABSTRACT

A brief introduction by Frank H. Spaulding, president of the Special Libraries Association, is followed by highlights of the findings of the appointed presidential task force on the value of the information professional and an executive summary of task force activities and reports. In addition, an introduction by Allen B. Veaner provides background information on the value of information and the information professional, including a definition of the problem, a summary of existing work, and a discussion of the task force approaches to the study. These approaches include: measuring time saved; determining actual monetary savings/gains; and providing qualitative, anecdotal evidence of value. The following reports by task force members are also included: (1) "Value of the Information Professional--Cost/Benefit Analysis" (Miriam A. Drake); (2) "The Corporate Librarian--Great Return on Investment" (Helen Manning); (3) "The Value of the Information Professional--The View from the Top" (James M. Matarazzo); (4) "A Case Study in Adding Intellectual Value--The Executive Information Service" (Ann W. Talcott); and (5) "The Impact Approach--Value as Measured by the Benefit of the Information Professional to the Parent Organization" (James B. Tchobanoff). (KM)

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President's Task Force on the Value of the Information Professional

Special Libraries Association
78th Annual Conference
Anaheim, California

June 10, 1987

Final Report **Preliminary Study**

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President's Task Force on the Value of the Information Professional

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Final Report **Preliminary Study**

Special Libraries Association

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THE VALUE OF THE INFORMATION PROFESSIONAL

In June 1985, I gave a talk at the Special Libraries Association Annual Conference in Winnipeg, Canada on "Today's Information Specialist - Tomorrow's Knowledge Technician: A Business Enterprise." At that time I issued a challenge to the membership and to the profession to define the value of the information professional. Information is a product that has both intellectual and economic value. To what degree do special librarians, information specialists enhance this product when they turn it into a usable form? What is the information professional's value/worth?

I would like to quote from my 1985 talk, and more specifically relate to you an analogy about the information professional. It concerns the production of yarn. You take raw cotton and spin it into yarn. Let's assume you get an even return, that is, you spin forty pounds of cotton and the yield is forty pounds of yarn. But the yarn isn't spewed out and jumbled on the floor: in that form it is useless. No, the yarn is wound on a spindle. The spindle itself is an inexpensive, mass-produced item. But the value is not the same, having a jumble of yarn on the floor with a spindle sitting next to it, as opposed to having the yarn wound on the spindle. Furthermore wound in one particular way so that the weaving machines can use it. If the yarn is wound in the wrong way, the yarn is useless. So what I mean by "spindle" is not so much the cheap little stick of wood, but rather the whole process of putting the raw cotton into a form that can be used by

the weaving machines. And the obvious question is, then, how much is that "spindle" actually worth? How much value has been added?

I suggest that the information specialist is like a spindle. We take raw information, like the raw cotton, and process it in such a way that it can be used most effectively by our library customers, like the weaving machines. If we really want, we can simply turn the raw information into "yarn" that falls in a jumble on the floor, and we can then gather it up and try to sell it to our customers. If the customer accepts it at all, there's no way it has as much value as it would if it were wound on a spindle. In other words, we add value by putting the information in the best, most usable form.

The basic question still remains: what is the spindle - the information professional - worth, what is the difference in value between the information in a jumble on the floor, and the information in usable form - wound on a spindle?

To meet this challenge, I appointed a Presidential Task Force to conduct research to help find answers to our value, our worth to the organizations we serve and to society. James Matarazzo of Simmons College agreed to chair the Task Force; the other members are: Miriam Drake, Helen Manning, Ann Talcott, James Tchobanoff and Allen Veaner. They have worked untiringly this year to discover the truths that will help you and me to be recognized for what we do.

Frank H. Spaulding
President, Special Libraries Association
1986-1987

PREFACE

What is the most important and yet the least palpable ingredient in every successful business? Information. Every CEO understands that information is the invisible force behind effective decision making. Every day we read or hear about the huge amounts of information produced, distributed, and stored in North America by manufacturers, research labs, and universities. We are constantly reminded of the mountains of printouts, the vast stores of information in computers, the riches of on-line database services, and the complexities of the many electronic communication networks that serve the economy.

But how do you get exactly the information you need when you need it? Where does it come from? Who finds it? Who manages it? Who separates the significant from the unimportant? Who adds value to raw facts and opinions by analyzing, organizing, evaluating, reprocessing, and packaging information into a truly useful tool for executive decision making?

Our rich panoply of information is not self-creating, self-organizing, self-indexing, or self-managed! Behind the analyzed and systematically presented information your company's executives receive is a staff of professional experts: information managers and librarians whose methods closely resemble the careful diagnostic and analytic work of the medical and legal professions. Working from your direct requests and specific problems, these information experts make information practical and powerful by applying their own knowledge of your company's goals and objectives. Collaborating with your company's research and administrative staff as full professional team members, they serve your company directly. If they do not have the requisite information at hand, they know exactly how to find it.

If your company has an information problem, your first and most valuable recourse is the professional staff of your company library or information center. Bring the problem immediately to these "information doctors"--the expert professionals who know how to diagnose, treat, and cure information problems.

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1. "Value of the Information Professional: Cost/Benefit Analysis" by Miriam A. Drake
2. "The Corporate Librarian: Great Return on Investment" by Helen Manning
3. "The Value of the Information Professional: The View from the Top" by James M. Matarazzo
4. "A Case Study in Adding Intellectual Value: The Executive Information Service" by Ann W. Talcott
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President's Task Force on the Value
of the Information Professional

HIGHLIGHTS OF FINDINGS

- The information professional must be prepared to prove the value of his or her services to the corporation. The Task Force studied three possible approaches:

  --Measuring time saved

  --Determining actual monetary savings/gains

  --Providing qualitative, anecdotal evidence of value

- The Task Force uncovered clear and compelling evidence of the value of the information professional to business:

  --Georgia Tech's on-line information system saves $1.2 million in faculty time. King studies show how the use of information professionals results in time savings in government and industry.

  --Texas Instruments' Houston library is a widely used corporate resource that frees up scientist and researcher time. Its return on investment is estimated to be 515 percent.

  --Top corporate executives testify to the worth of the information professional. According to an Amoco executive, information professionals help the company "make better decisions . . . and avoid costly mistakes."

  --A responsive information expert becomes an essential resource for a high-tech company, aiding in managerial decision making as well as in research and development.

  --Real-life examples prove quantitative worth of the information professional--for example, an $11 database search saves a company 200 hours of lab work.

- Further research, building on the Task Force's foundation, is required to design and document systems for measuring value.

President's Task Force on the Value of the Information Professional

EXECUTIVE SUMMARY

- The President's Task Force on the Value of the Information Professional was charged with investigating approaches to determining the value of information and the value of the information professional. Chaired by James M. Matarazzo, the Task Force included Miriam A. Drake, Helen Manning, Ann W. Talcott, James B. Tchobanoff, and Allen B. Veaner.

- The Task Force addressed three basic approaches to measuring value:

  --Measuring time--and its monetary equivalent--saved by information services and products

  --Determining real savings, financial gains, or liability avoidance

  --Assessing the worth of qualitative, anecdotal evidence

- Miriam Drake shows how the common technique of cost/benefit analysis can be used to quantify the worth of the information professional.

  --Georgia Tech's on-line information system saves an estimated $1.2 million in faculty time.

  --King studies reveal that government and industry reap savings through the use of information professionals.

- Helen Manning illustrates how Texas Instruments' libraries save money by freeing up scientist and researcher time. A survey of TI's Houston library clients shows:

  --High degree of use

  --Benefits provided by <u>both</u> the library and the information professionals

  --An overall return on investment of 515 percent

- James Matarazzo collects testimonials from leading business executives that reveal the many benefits of the information professional:

--System Planning Corporation: "The library staff . . . are more important to us than the books, documents, and searches."

--McKinsey and Company: "Each year, we find they have contributed to the firm's clients."

--Amoco: "The value . . . is in helping the company make better decisions . . . and avoid costly mistakes."

- Through a case study of a high-tech company's Executive Information Service, Ann Talcott portrays the successful information professional. The professional makes himself an essential member of the corporate team by:

  --Anticipating the needs of his clients and getting them the information they need when they need it

  --Analyzing and packaging information to make it immediately useful

- James Tchobanoff uses the "impact approach"--proving the value of information professionals by identifying the actual benefits they bring to their parent organization.

  --A company could have saved $500,000 in R&D costs by investing $300 in a library search of patents before beginning product development.

  --The findings of an information professional prove a $7 million lawsuit fraudulent, saving the company large legal bills.

  --An $11 database search saves a company 200 hours of lab work.

- The Task Force's work provides a strong foundation for measuring and proving the value of the information professional:

  --Quantitative value: real cost savings

  --Qualitative value: time savings, increased productivity

- Continued research should build on this foundation. The future of information professionals depends on their ability to clearly and persuasively justify their position in the corporation.

INTRODUCTION

by Allen B. Veaner
Principal
Allen B. Veaner Associates

BACKGROUND

At the 1985 meeting of the Special Libraries Association in Winnipeg, President-elect Frank Spaulding challenged the membership to develop responses to two critical issues: the value of information and the value of the information professional.[1] Spaulding appointed James M. Matarazzo, Associate Dean of the Graduate School of Library and Information Science, Simmons College, to chair a six-person Task Force to meet the challenge. Besides Matarazzo, the Task Force included Miriam Drake (Georgia Institute of Technology), Helen Manning (Texas Instruments), Ann Talcott (Library and Information Management Consultant), James Tchobanoff (Pillsbury Company), and Allen B. Veaner (Allen B. Veaner Associates). The Task Force has met three times: December 1-2, 1986, and January 29 and May 5, 1987. This preliminary report is issued in conjunction with the President's Program on the Value of the Information Professional, held June 10, 1987, at the SLA meeting in Anaheim.

DEFINING THE PROBLEM

Whether as an expression of "manifest destiny" or because the benefits to the state and community were considered obvious, the existence of libraries, librarians, and information professionals has been axiomatic in the social development of North American society. In the United States, the library, its collections, and its staff have been upheld as a preeminent "good" throughout a century-long era of economic expansion unparalleled in the history of any other country. Now, because of the global redistribution of economic power, that picture is changing rapidly. No longer can libraries and information professionals be complacent about their "good" status. The benefits of the information profession need to be defended with the same vigor that managers of other services bring to their funding agencies.

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[1]Frank H. Spaulding, "Today's Information Specialist--Tomorrow's Knowledge Technician," Winnipeg, 1985, pp. 15-19.

In this era of economic contraction, the defense of an organization's budget is probably the most vexing challenge facing the manager. Nowhere is the frustration greater than in units providing intangible services or products that contribute only indirectly to an enterprise's bottom line. Typically, these include support services and certain management functions: accounting, purchasing, personnel, plant and office maintenance, and the library. All are lumped together as overhead. When a unit's outputs are incommensurate with the usual quantitative standards of productivity that relate to manufacturing or the supply of services of a more or less standardized character, the funders tend to see that unit's outputs as insubstantial and inessential--in a word: dispensable. Industry's stress on unit production costs tends to obscure the worth and contribution of the human capital behind the production of all goods and services.[2] Information professionals are perceived to consume resources rather than generate revenue; their work cannot easily be apportioned and attributed to the unit cost of an industry's output.

Aside from the fact that library operations have been lumped into an organization's overhead and suffer from the unit-cost bias, there are yet five other fundamental obstacles to a full appreciation of libraries, library services, and information professionals:

- Traditionally, library products and services have been given away; today, corporate libraries are increasingly instituting internal market economies or chargeback systems by which a unit's services are "proven" worthwhile.

- Librarians have not had to master the political and public relations skills needed to create and maintain a positive image of their own essentiality and importance. Other, more aggressive players often "take over" research results which information librarians derive. Bypassing the library and claiming the output as their own, they deprive the library of due credit.

- Unlike a manufactured product or standard service, information is not measurable in any standard unit and thus cannot easily be priced; information worthless to one organization may be priceless to another.

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[2]Paul A. Strassman, Information Payoff: The Transformation of Work in the Electronic Age (New York: Free Press, 1985), pp. 100-109, 217-219.

- Information is not used up or degraded, either by intermediate level users or the ultimate decision maker.

- The information professional's work--the creative activity that actually adds value to the otherwise inert material in the collection and makes it usable by and for clients--is unobservable mental work. Its invisibility to clients adds to its general lack of appreciation and low valuation.

In such a context, how is it possible to justify the expenses of a library or an information center and explain to the funders the tremendous added value the professional staff contributes to the organization as a whole? This question guided the work of the Task Force.

EXISTING WORK

Comparatively little research has been done on the value of information and still less on the value of the information professional. The systematic study of this problem is a recent phenomenon. In the 1982 Annual Review of Information Science & Technology, Jose-Marie Griffiths gave the subject its first full treatment. In her review, Griffiths identified only 27 pertinent studies between 1968 and 1982.[3] Since that time, new published studies (e.g., Taylor [1986]) have continued to focus on the value of information and the information supplying agency, to the virtual exclusion of the information professionals who add value by organizing information, creating retrieval tools, developing and managing facilities, and interacting with clients. How can their value be measured?

TASK FORCE APPROACHES

Early in its deliberations, the Task Force concluded that determining the value of the information professional would entail a major research effort beyond its immediate resources. It was clearly impossible to develop any simplistic formula that SLA members could universally use to justify their services, staff, and budgets. Even if a valuation "formula" could be

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[3]Jose-Marie Griffiths, "The Value of Information and Related Systems, Products, and Services," ARIST 17:269-284 (1982).

derived, it is quite likely that it would have to take into account constantly changing, highly complex variables and would thus need to be tailored to individual environments. Instead, the Task Force concentrated on defining possible approaches to the valuation of information professionals and their work. The Task Force regards its current findings mainly as preliminary, serving a heuristic purpose. It will take continued in-depth research to reach conclusions that can be broadly and readily applied to the business world.

The Task Force members identified and addressed three basic approaches to measuring the value of the information professional:

- Measuring the amount of clients' time--and its monetary equivalent--saved by using the information professional's products and services. Possible tools for this method of valuation include:

  --In-plant measurements (Manning)

  --Magnitude estimation (Drake)

- Determining significant instances of real-dollar cost savings, financial gains, or liability avoidance directly attributable to the utilization of a professional's information services (Tchobanoff).

- Assessing the worth of "testimonials" and other anecdotal evidence from scientists or corporate officers as opposed to "hard data" (Matarazzo, Talcott).

ACKNOWLEDGEMENTS

The Special Libraries Association and Task Force members express their appreciation to Turner Subscription Agency, EBSCO, G.K. Hall, and Frank Spaulding, for their support of the group's travel and subsistence.

READINGS

VALUE OF THE INFORMATION PROFESSIONAL
COST/BENEFIT ANALYSIS

Miriam A. Drake
Director of Libraries
Georgia Institute of Technology

Introduction

The value of services provided by information professionals are viewed separately and apart from the value of information itself. The value of information when received by the individual usually is assessed on the basis of the degree to which the information has met the individual's need. The contributions of the information professional are the value added to the information product, greater productivity of the information seeker and user and a more informed basis of decision making.

Costs and Benefits

Cost/benefit is one of the tools used by policy makers, administrators and managers to evaluate alternative uses of money. It is one technique for evaluating the value of economic inputs to outputs and for determining the value produced resulting from the value invested. The purpose of cost/benefit analysis is to relate costs to value received. Cost/benefit analysis is used formally or informally, analytically or intuitively, to evaluate investment in programs, people, equipment or the continuation of programs. The Congress and the Executive branch daily use cost/benefit analysis to determine whether investment in programs, such as disease prevention, on-board mid-air collision avoidance devices and various education programs will return greater benefit than cost.

Corporate management uses cost/benefit analysis to evaluate the desirability of various fringe benefits for employees, social or community programs, public relations, R & D investments and information services.

Often the cost/benefit ratio applied to information services is clear, especially when the acquisition of information results in a decision which either saves money for the company or provides the opportunity for increased profit. Some measures of benefit cannot be quantified. We don't know the value of general reading which may result in a better informed citizenry. We cannot easily put a dollar benefit on the reduction of ignorance in society or the benefits of a patient learning about the side effects of prescription drugs.

We know that the most valuable asset of employers' is the value of employees' time and creative energy. All employers want to increase the productivity of time and energy. Most corporate activities, for profit or not-for-profit, depend on information and getting information to the right people at the right time. Most people do not know where to look for information or how to find the information they need. Increasingly, they must depend on the information professional to find, evaluate and synthesize information to enhance the value of their time and efforts.

Physician Analogy

People seek the services of information professionals for the same reasons they go to physicians, attorneys or accountants. They have a problem and need help in solving it. They are seeking help because they cannot solve the problem themselves. Information is not the solution to their problem. It is a tool to help them and provide a basis for solving the problem. The goal of seeking information may be problem solving, decision making, learning, pleasure or enrichment of personal knowledge.

The information professional uses specialized education and knowledge, experience, observation, data and communication to define the problem and solve it. The physician observes symptoms, queries the patient about how he or she feels and views the results of diagnostic tests. When all critical data have been gathered, the physician synthesizes the results, renders an opinion and recommends a course of treatment to the patient. The measures of success are how well the symptoms are relieved, whether the patient is cured, how well the patient feels and, in some cases, whether the patient lives or dies. The benefits of the multi billon dollar health care industry are measured on how healthy people are and how they feel. The indirect benefits to the economy are reduction of time lost in the work place, increased productivity of the worker and, in some instances, the saving or extension of life.

The information professional's work is similar to the physician's in observing the client, querying the client about the problem, searching for data or information and synthesizing the results and delivering an information product to the client. The immediate measure of success or benefit is the degree to which the information helps the client to solve the problem. The indirect benefits are increased client productivity, an informed basis for decision making and, in some cases, the savings of thousands or millions of dollars for a company, university or government.

The Work of Information Professionals

The work of information professionals includes acquisition of source documents and data bases in anticipation of use, preparation of bibliographic/ indexing information, preparation of material, design and implementation of information retrieval systems for direct user access, retrieval of information as intermediary, knowledge of where to obtain information and data and evaluation and synthesis of information in the form of documents, summary reports or data in machine readable form.

The basic information service, familiar to most library users involves acquisition of information resources, archive/self service and making bibliographic and information resources available for direct use. (See Figure 1). Many users prefer to search bibliographic and indexing resources, retrieve documents and evaluate and synthesize information by themselves. Using these basic services results in significant direct and indirect costs for the user and some probability that the search will be unsuccessful. The direct cost is the value of user time. The indirect costs are opportunity cost or the value of activity foregone.

At the access, the information professional, after consultation with the client, performs the search of bibliographic and indexing sources and produces a list of documents and sources likely to contain data and information to satisfy the client's need. The user indicates which documents are to be delivered and the information professional carries out delivery. The client must go through the documents to find the needed information. Depending on the complexity of problem and the number of documents, this process may be very expensive in terms of the client's time.

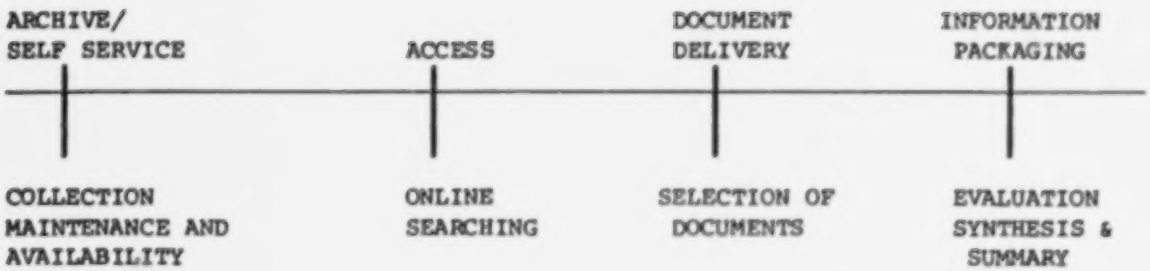
At the highest level, the information professional works closely with the client to delineate the need for information. The professional carries out the search, reads the documents or data, evaluates the information and delivers a summary report to the user. A variation on this method is the delivery of only documents the professional assesses to be pertinent to the user's need. The information packaging level of service tailors the product to the client's needs and adds the greatest value to the information. Compared to the archive level the investment by the information is minimal and value received the greatest.

The value of these services varies with the familiarity of the user with information resources, the value of the user's time, cost of the information professional's services and the opportunity cost born by the user. When the user interacts with the information system directly, the results may or may not be accurate or effective depending on the skill of the user. The information professional's background, education and experience usually are far greater than most information seekers.

The economics and effectiveness of information finding are changing rapidly due to online data bases and data bases available on CD-ROM. The effectiveness of direct user online searching depends on the quality and relevance of the data base, the user's online searching skills and how well the user understands the problem and articulates the need in language appropriate to the source being used. As more people become more experienced with computers and online data bases their skills in searching will increase.

FIGURE 1

COST AND VALUE ADDED



HIGHEST USER COST <----------> LOWER USER COST

HIGHEST OPPORTUNITY COST <----------> LEAST OPPORTUNITY COST

DOCUMENT FOCUSED <----------> CLIENT FOCUSED

LEAST VALUE ADDED <----------> MOST VALUE ADDED

King Research

King Research during the last several years conducted in-depth studies of information use in twelve companies or government agencies. The King studies found that reading books, journals and technical reports resulted in a 10 to 1 return on investment. This return resulted from savings, ". . .achieved by avoiding having to do certain work at all, modifying the work or stopping an unproductive line of work".(1)

King also pointed out, "Time of professionals is a scarce resource. Professionals must decide how to utilize their time in order to be most productive. . . Their decisions to use their scarce resource for information seeking and reading are a strong indication of the value they place on information".(2)

"The value of library services can be assessed from three perspectives: what users are willing to pay (in terms of their time and effort) for information provided by the library, how much more it would cost them to use alternative sources for obtaining the information, and what benefits (or research cost avoidance) would be lost if the library did not exist. Rough estimates of the average value derived per professional for these three perspectives are given below.

Value Perspective	Value	Return on Investment
Willingness to Pay	$ 4,500	4.5 to 1
Additional Cost to Use Additional Sources	$ 3,800	3.8 to 1
Lost Benefits	$11,500	11.5 to 1"(3)

In a study of information services provided to small high tech businesses, King Research found, "The average cost of small businesses of searching is nearly $4000 per search". $3,715 of this cost is spent in user time, preparing for the search, negotiating the search, scanning output, and reading text or abstracts. The average cost of the search itself, when done by an outside firm is about $300. "The principal reasons that scientists use intermediaries (e.g., outside services) for searching is that it generally costs them less to do so and the intermediaries usually search better because of their experience".(4)

Georgia Tech

In late 1986, Georgia Tech implemented an online information system which is available to students and faculty anywhere on campus. Students may use the system from network connections in their dorm rooms. Faculty and students may dial in from home. The system contains five data bases; GTEC (the Georgia Tech Library Catalog), Magazine Index, Computer Index, Management Contents and Trade and Industry Reports. The operating costs of the system are approximately $750,000 per year. On the basis of preliminary estimates, 5,000 searches per week are conducted from remote (non library) terminals and PC's at an average cost of $6.00 ($1.50 data base cost plus $4.50 user time). The average cost of a library search using printed materials in user cost alone is estimated at $22.50. Using that average cost, the estimated savings in faculty time produced by the online system is $1.2 million.

The Library's online information system contains a message system which permits faculty to transmit document requests to the Library. Faculty also may use 2 electronic mail systems or the telephone to transmit requests. The Library delivers documents to faculty offices and research facilities twice each day at a cost of $24,000 per year. About 12,000 documents will be delivered this year resulting in a savings of $336,000.

REFERENCES

[1]King, Don and Jose' Marie Griffiths, Special Libraries and Information Services - Increasing The Information Edge.
Rockville, MD., Information Frontiers Publications, to be published.

[2]Ibid.

[3]Ibid.

[4]Ibid.

THE CORPORATE LIBRARIAN: GREAT RETURN ON INVESTMENT

Helen Manning
Coordinator, Semiconductor Group Libraries
Texas Instruments, Inc.

What is the value of a professional librarian to a corporation? Why do corporations hire professional librarians in the first place? How do managers justify the added overhead expense of hiring a new person and how do they continue to justify the position when the economy turns down? To answer the first of these questions and to help managers answer the others, Texas Instruments conducted a library user survey in early 1987. The results proved conclusively that corporate librarians provide a high return on investment.

Texas Instruments (TI) is a multibillion-dollar high-tech company based in Dallas with worldwide operations. Like other high-tech businesses, TI introduces products of ever-increasing sophistication at breakneck speed, so the window for success of any given product is very narrow. Because TI recognized very early that one of the keys to success is having the right information at the right place at the right time, the company has invested intensively in its libraries for more than 25 years. A recent study of the payoff of TI's investment demonstrates a return on investment (ROI) of 515 percent! In 1986 TI's Houston-based library operations and personnel saved the company $959,000, yet cost only $186,000. This ROI is in keeping with the results of similar surveys among all TI libraries, where the return averages 400 percent.

HOW TI LIBRARIES ARE STRUCTURED

The management of TI's technical libraries parallels the decentralized pattern of the company itself. TI libraries report to their operating groups or site management, not to a central library manager. Although this structure has advantages and disadvantages, one immediate plus is the ability for any single library to react quickly to the changing needs of its site. One excellent method for determining these needs is to survey the people at the site regularly.

TI'S HOUSTON SITE LIBRARY

The Houston Site Library has grown since the mid-1970s from a closet of books monitored by a secretary to a 1,600 square-foot model library in the atrium of the main building. The library is now staffed by one professional librarian and one clerk and has two Texas Instruments Professional Computers, a photocopy machine, a telefacsimile machine, four telephone lines, 2,000 books, and 250 subscriptions. The library receives strong support from high-level management.

Over the years, a host of variables have determined the needs for library services. The site population has increased and decreased, products have been developed and then moved to other sites for manufacture, product lines have been introduced or cancelled, and off-site buildings have been added, moved, or closed.

In 1979 the librarian started an annual user survey to determine where the library users were physically located and what kinds of support they needed. In 1981 two questions were added to the survey regarding the engineers' perception of the effects of library services on time saved and job proficiency. Responses allowed the librarian to determine the return on investment (benefit divided by cost) that the company derived from library services. At that point the user survey was administered to all TI sites with libraries and the results sent to TI executives.

1987 USER SURVEY

In 1987 the Houston Site Library survey was further refined. A new question was asked regarding the engineers' perceptions of the amount of time the librarian, not the services, saved them. This question was TI's first attempt to quantify the value of the information professional. (See Appendix for a copy of the survey form.) For example, if the engineer came into the library, browsed through the journals and found a relevant article, the time saved would be attributed to library services. However, if the librarian scanned the journals and spotted an article with potential interest and then forwarded it without being asked for it, the time saved would be attributed to the librarian.

This user survey was sent to a sample of 750 Houston users (such exempt staff as engineers, managers, marketeers, and scientists); 16.4 percent were returned. However, more than 16 percent of the site staff actually uses the library. Although more

than 50 percent of the exempt population at the site are probably library users, for the sake of this analysis we doubled the responses for a conservative estimate of a user base of 32 percent. The responses were tabulated and analyzed using the Statistical Analysis System program package.

RESULTS SUPPORT VALUE

The results of the user survey support the value of the librarian to TI.

- Library users increased from 55 percent of exempt staff in 1980 to 81 percent in 1987 (see Table 1). Similarly, use of all services increased by at least a factor of 2, with some services, such as computerized literature searches, increasing by as much as a factor of 13.

- The return on investment was calculated to show management what TI gets in return for supporting the librarian and/or the library.

Table 1

LIBRARY USER SURVEY
TI HOUSTON

	1980	1987
Did Use Library Services	55%	81%
Which Services Did You Use?		
Read Journals	28%	76%
Order Books	8	41
Check Books Out	16	57
Order Subscriptions	5	25
Reference Questions	20	63
Interlibrary Loan	5	26
Computer Searches	4	53
Standards & Specs	5	21
Didn't Use Library Services	45%	19%
Why Not?		
Not Aware of Library	0%	4%
Information Not Available	21	17
Not Required for Job	31	48
Not Accessible	34	22
Other	14	9

CALCULATING THE RESULTS

Three survey questions were asked to determine the value of the library:

> 15: What impact do library services have on your ability to do your job?
>
> 16: How many hours would you estimate library services save you per month?
>
> 16a: How many hours would you estimate the librarian saves you per month?

Since questions 16 and 16a are similar, Tables 2 and 3 include the responses to both. In each case, the respondents wrote in a number. These numbers were grouped for this analysis and we took the average of each group. For example, we used 3 hours for the people who responded that 1-5 hours were saved. To calculate the value of time saved, we multiplied the number of hours by the number of responses by $22/hour (an average engineer's salary, not including benefits or overhead) by 12 months. Then we increased the result by a factor of 2 to reach 32 percent of the site population. The results showed that library services saved TI $268,800, and the librarian accounted for savings of $167,400 more. In other words, 12,216 hours/year are saved by library services and an additional 7,608 hours are saved by the librarian. Because the standard work week at TI is 45 hours, 19,824 hours saved is equivalent to adding 8.9 engineers to the work force, or 8.9 man-years. Because engineers' time is at a premium, this is a number high-level managers can appreciate.

The librarian also improves job proficiency, as proved in the third key question:

> 15: What impact do library services have on your ability to do your job?

The respondents had four answers to choose from: negligible, slight, moderate, or significant. After much discussion with engineers and managers, we estimated the following annual value for each response:

Negligible	$0
Slight	$500
Moderate	$2,000
Significant	$5,000

Table 2

LIBRARY USER SURVEY TI HOUSTON
BENEFIT-TIME SAVED

HOURS	Q 16: HOW MANY HOURS WOULD YOU ESTIMATE LIBRARY SERVICES SAVE YOU PER MONTH?	Q 16a: HOW MANY HOURS WOULD YOU ESTIMATE THE LIBRARIAN SAVES YOU PER MONTH?
Less than 1	12%	18%
1-5	53	60
6-10	23	8
11-15	2	1
More than 16	7	3

Table 3

LIBRARY USER SURVEY TI HOUSTON
BENEFIT-TIME SAVED

			Time Saved By Library Services	Time Saved By Librarian
1-5 Hours Average		=	$ 41,976	$ 47,520
6-10 Hours Average		=	48,576	16,896
11-15 Hours Average		=	6,864	3,432
Over 16 (21 Hours)		=	36,960	15,840
Savings to TI/Year[1]	Average	=	$134,376	$ 83,688
Hours Saved/Year	Average	=	6,108	3,804
	Factored Up	=	$268,752	$167,376
			12,216 Hrs	7,608 Hrs
Man-Years (Man-Years=45 Hrs/Wk x 50)			5.5	3.4

[1]Number of Responses x Hours/Month x $22/Hour x 12 Months.

After multiplying the number of respondents by the assigned value and then factoring up to 32 percent, we determined the value to TI for increased job proficiency to be $523,000 (see Table 4).

Table 4

LIBRARY USER SURVEY TI HOUSTON
BENEFIT--INCREASED JOB PROFICIENCY

	K$/Yr	Survey Respondents	Benefit Of Sample (K$/Yr)
Negligible	0	13	0
Slight	0.5	29	14.5
Moderate	2.0	36	72
Significant	5.0	35	175
Total		113	261.5

However, 32 percent of site population are active library users. Factored up, net benefit would be $523,000.

RETURN ON INVESTMENT

To calculate the total benefit the library provides, we added the answers to the three questions (see Table 5). The total benefit to TI was $959,000. Because the site library cost $186,000 to operate in 1986, this gives a return on investment of 515 percent. That means Texas Instruments invested $186,000 in one library and got $959,000 back in benefits. These high numbers are similar to results from two corporate-wide library surveys in the past four years which showed an average of 400 percent ROI for all TI libraries.

Table 5

LIBRARY USER SURVEY TI HOUSTON
BENEFITS

(dollars in thousands)

	1987 (Factored)
Annual Savings Based on Impact on Job	$523
Annual Savings Based on Time Saved by Services	269
Annual Savings Based on Time Saved by Librarian	167
Total Savings	$959
Annual Operating Cost of Library	$186
Net Benefit	$773
Return on Investment[1]	515%

[1]Savings Divided by Cost.

VALUE OF THE LIBRARY

The library affects a large number of people and projects (see Table 6). Eighty-one percent of the respondents said the library has some impact on improving their job proficiency and 28 percent said that impact is significant. That means that the majority of engineers work more effectively because of the services provided by the library. Additionally, the librarian saves at least one hour of work per month for 58 percent of the respondents. For every 180 people who save one hour per month, the site gains the equivalent of one extra engineer per month, or one man-year of engineering time for 12 months. Since there are strict controls on staffing levels, time spent on engineering work can be worth more than money--it can mean the difference between the success or failure of a product.

Table 6

TI CORPORATE LIBRARY SURVEY
LIBRARY IMPACT

- 81 percent of respondents said library has impact on job.
- 28 percent of respondents said library has significnt impact.
- 58 percent of respondents said librarian saves at least one hour per month.
- 69 percent of respondents said library services save at least one hour/month.

VALUE OF THE LIBRARIAN

We were specifically interested in the value of the librarian to TI. For this calculation we estimated that 75 percent of the librarian's time was devoted to helping library users either directly (e.g., answering questions or doing literature searches) or indirectly (e.g., ordering books or scanning journals) and that 75 percent of library assets (e.g., computers or journals) were used during this time. We divided the benefit of the time saved by the librarian ($167,000) by the operating cost of the librarian ($139,000) and got a return of 119 percent. To put this in the proper perspective, consider that the median return on assets for Fortune 500 electronics firms was 4.1 percent for 1986. In this light, it becomes obvious that hiring a librarian is one of the best investments a company can make.

TEXAS INSTRUMENTS INCORPORATED
1987 LIBRARY EVALUATION SURVEY

The TI Technical Libraries are designed to offer you a variety of professional information services. Your participation in this year's library evaluation survey is essential in evaluating the quality of these services and creating new programs to meet TI's changing information needs.

As a result of your response to the 1982 survey, we were able to determine the return on investment (400%) for TI's libraries. An executive summary of the results was sent to high level managers in all Groups and helped increase library support.

Your response today will help determine future library services, so please take a few moments to answer the questions on the following pages. If you need assistance, contact Helen Manning at 274-2981. Completed surveys should be returned to M/S 695 within 5 days of receipt. Results will be published when all responses have been processed.

Please deliver to:

1987 TECHNICAL LIBRARY EVALUATION SURVEY

Please respond to each question by placing the appropriate letter(s) or number in the answer block [ ] provided.

DEMOGRAPHIC DATA

1. What is your primary occupational area? 1 [ ]

A Contract Administration
B Control & Finance
C Development & Planning
D Engineering – Chemical
E Engineering – Electrical
F Engineering – Electronic
G Engineering – Mechanical
H Engineering – Industrial
I Facilities
J Geophysical Services
K Geophoto Services
L Internal Services
M Legal
N Management
O Manufacturing & Production
P Marketing
Q Personnel
R Purchasing & Materials
S Quality Assurance
T Research
U Systems/Programming – Systems Analysis
V Systems/Programming – Programming, Data Base Administration
W Other

2. What is your division? (enter number) 2 [ ]

3. What is your cost center? (enter number) 3 [ ]

4. What is your mail station? 4 [ ]

5. How many years have you been employed at TI? 5 [ ]

6. How have you learned about library services at Texas Instruments? 6 [ ]

A TI Orientation
B Presentation by Librarian
C Colleague
D Library Brochure
E Unaware of Service
F Other (Please specify) _____

7. If you have not used the TI technical libraries, which of the following reasons best explains why? Then, go to Question 18. 7 [ ]

A Not aware of library facilities
B Information needed is not available in library
C Job does not require use of library
D Library not easily accessible at my location
E Library hours not convenient
F Other (Please explain) _____

8. Please indicate your use of the following services: (On a scale of 1-5, 1 = use service very often, 2 = use service often, 3 = use occasionally, 4 = aware of service but don't use, 5 = not aware of service.)

A	Current journals and newspapers	8A [ ]
B	Marketing literature	8B [ ]
C	Vendor catalogues	8C [ ]
D	IBM systems reference manuals	8D [ ]
E	Standards and specifications	8E [ ]
F	Book check out	8F [ ]
G	Journal check out	8G [ ]
H	Reference	8H [ ]
I	Interlibrary loan	8I [ ]
J	Computerized literature search	8J [ ]
K	Book orders	8K [ ]
L	Subscription requests	8L [ ]
M	Technical Reports	8M [ ]

9. Which libraries have you used during the past year? (list all that apply) 9 [ ]

A TI - Austin
B TI - Cypress
C TI - Forest Lane
D TI - Houston SW (GBI, Bldg. I, and Wilcrest II)
E TI - IS&S (Northgate)
F TI - Lewisville
G TI - McKinney
H TI - North Bldg.
I TI - Research Bldg.
J TI - S/C Bldg.
K TI - Sherman
L OTHER - TI (Please specify) _____
M OTHER - NON-TI (Please specify) _____

10. Which Library do you use most frequently? 10 [ ]

A TI - Austin
B TI - Cypress
C TI - Forest Lane
D TI - Houston SW (GBI, Bldg. I, and Wilcrest II)
E TI - IS&S (Northgate)
F TI - Lewisville
G TI - McKinney
H TI - North Bldg.
I TI - Research Bldg.
J TI - S/C Bldg.
K TI - Sherman
L OTHER - TI (Please specify) _____
M OTHER - NON-TI (Please specify) _____

11. How many times have you used TI library services during the past six months? 11 [ ]

12. During the past year, has your usage of the library – 12 [ ]

A Increased
B Decreased
C Remained the same

13. Are you a CURRENT AWARENESS (CA) participant? A Yes B No 13 [ ]

14. Do you usually request articles through: A CA Office B TI Library 14 [ ]

LIBRARY IMPACT

15. What impact do library services have on your ability to do your job? 15 [ ]

A No impact
B Slight impact
C Moderate impact
D Significant impact
E Don't know

16. How many hours would you estimate library services save you per month? 16 [ ]

16A. How many hours would you estimate the librarian saves you per month? 16A [ ]

QUALITY OF SERVICES

17. Please rate the quality of the following at the library you use most frequently: (on a scale from 1-5, 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Don't know)

A	Current journals and newspapers	17A [ ]
B	Marketing literature	17B [ ]
C	Vendor catalogues	17C [ ]
D	IBM systems reference manuals	17D [ ]
E	Standards and specifications	17E [ ]
F	Book check out	17F [ ]
G	Journal check out	17G [ ]
H	Reference	17H [ ]
I	Interlibrary loan	17I [ ]
J	Computerized literature search	17J [ ]
K	Book orders	17K [ ]
L	Subscription requests	17L [ ]
M	Technical Reports	17M [ ]
N	Service	17N [ ]

18. Please note additional comments, recommendations, or criticisms below. If you'd like to see certain books or journals in the library, or if you think the library needs any equipment, please be specific. If you do not have a library in your building, do you think you need one?
You don't need to sign your name, but please do if you want us to respond.

THE VALUE OF THE INFORMATION PROFESSIONAL: THE VIEW FROM THE TOP

James M. Matarazzo
Associate Dean of the Graduate School
of Library and Information Science, Simmons College

The author is in the process of conducting a study on excellence in corporate libraries, including 13 libraries identified as "outstanding" by representatives of the six largest chapters of the Special Libraries Association. As a part of the Task Force's study on the value of the information profession, corporate managers in the 13 companies were asked to comment on the value of the information professional to their corporation. Excerpts from their comments appear below.

System Planning Corporation — Dr. Ronald Easley, President/CEO

"The value of the library staff is their ability to get information for the research staff--to know where to find it. These people are more important to us than the books, documents, and searches. It comes from years of experience--the ability to hear what a person wants and figure out where to get it.

"The library staff is an extension of the research staff. It is more cost-effective to have the library professional search for information needed by the researchers. Researchers have to be careful of their time. The value is shown by the yearly increases in use. Two-thirds of the librarians' time is spent with the researchers, which is fine with me."

McKinsey and Company, Inc. — Dick Cavanaugh, Principal Partner

"We are consultants and the information professionals serve the firm in a variety of roles. They are team members, they are specialists in research, and they are a firm resource. At the end of each year, we ask if the information professionals added value to our clients or not. Each year, we find they have contributed to the firm's clients. These individuals, as members of our consulting teams, not only conduct research but also figure out what to do with it. Frankly, these people can find anything we need and we value that highly."

Foote, Cone & Belding

W. R. Wirth, Jr.
Executive Vice President,
Corporate Resources

"Being in the service business, we at Foote, Cone & Belding are acutely aware of the critical difference that people make to our operations. As an old advertising saying goes, 'Our inventory goes down the elevator every night.'

"Anyone can buy computers or subscribe to data banks and other information resources. But what John Kok has done is to gather and train a group of professionals who know how to exploit those resources to meet the particular information needs of our organization. He and his people are critical to the success of our information center. They add the value that yields returns from the investment."

John Hancock

John Howland
Second Vice President,
Administrative Services

"At John Hancock we recently completed a survey on the value of the information services and the staff. The overwhelming response to the survey was highly positive relative to the professionalism of the staff and their ability to find needed information for the corporation. Specifically singled out were the staff of the library and their contributions to the corporation."

Atlantic Richfield Company

Alan Brittner
Manager, Systems
Services

"The value that management sees is the ability of the information professionals to search the literature and provide answers. These people are valued here. They understand the context in which questions are being asked. It is a mixture of knowledge of the sources, the company, and the use of data along with the ability to interpret the request which provides the value.

"Senior management has already asked really hard questions about the value of the information professionals, and these people were very highly rated. Indeed, use has increased."

Sanders Associates, Inc.

H. Ronald Berlack
Manager, Configuration
and Data Management

"The staff of the library add value by their experience, expertise, and knowledge in carrying out their assignments. The staff in the technical library are experienced and each can carry out a variety of assignments. The staff are dedicated to service.

"The manager of the technical library provides excellent service and is valuable as a manager in maintaining a high level of service. The service is accurate, with an optimum amount of information delivered to the user.

"I am aware of the contributions each of these individuals makes to each of our research projects."

Time Inc.

Christina Walford
Director, Editorial
Services

"All of the people at Time's library contribute to the quality of the operation, from the excellent staff members who amass, maintain, and prepare the data to the research librarians who prepare background materials. The library at Time is also well managed, and that is carefully planned.

"In the end, the users interact with the research librarians who are also offered continuing opportunities for training. The research librarians have the time and the expertise to prepare background material for stories, which is one of their key functions. For Time, the value is having a pool of expert librarians in a single library to deliver efficient service to the magazine served."

Abbott Laboratories

Dr. John H. Seely
Director, Products
Division R&D Planning

"We are largely organized in teams in functional areas. Each area has a corresponding specialist in the library who is assigned to the teams. The information professional provides all kinds of valuable information to members of the teams automatically. Often, team members are too busy to have the time to find the needed literature. The information professional is able

to cull the needed material and bring it down to a manageable amount based on a knowledge of team interest and of the literature.

"In terms of the products we are trying to bring to the market, a team of information professionals keeps track of activities in these fields so that we know how we stand up against the competition. A similar liaison exists to marketing as well as other corporate areas."

Amoco Corporation

Glenn Smith
Manager, Information and
Computer Service

"The value of the information professional is in helping the company to make better decisions. In order to make correct decisions, you need to have the best information concerning the alternatives at hand. Therefore, whether you are considering a new area of research or a new business venture, having ready, accurate information can assure that you make the right choices and can help you avoid costly mistakes."

Allergan Inc.

Lester Kaplan, Ph.D
Director, Scientific and
Technical Services

"Allergan is a company based on a broad spectrum of technologies. In order for us to function efficiently and competitively, accurate and timely information is essential. The explosion of scientific advances in our field of interest makes it impossible for individuals to follow all relevant developments in a comprehensive fashion. Information professionals play a critical role in our corporation by supplying their customers with the facts they need to perform their job effectively. Information professionals are integral and valued members of our corporate team."

Chevron Oil Company

"The value of librarians (information analysts) in a corporate setting is measured by their contribution to the productivity of other staff--the library's clientele. Librarians enhance productivity by (1) providing the information needed in the decision-making processes of managers, analysts, and other employees in a cost-effective and relevant manner; (2) anticipating needs both of individual clients and of the company as a

whole; (3) utilizing information storage and retrieval technology to the fullest to acquire and deliver information in a format useful to the requestor; (4) publicizing their services and educating requestors so that library resources and services are used to optimum advantage to meet the business needs of the company; (5) training their library staff--both professional and support persons--to provide efficient service in a business-like manner; and (6) interfacing effectively with other groups within the company including other libraries, information centers, experts, and other sources of information. The value of the services and of the specific information provided to company employees will define the value of the librarian (information analyst) and of the library."

Chevron Research Company — Jackie Desaer

"Well-managed companies hire employees who are experts in their respective fields. Further, all company employees--administrators, business people, scientists, technicians, support staff--require varying amounts of published information to do their jobs effectively. Company librarians are experts in the information fields. They improve employee productivity in two ways: (1) by locating needed information more quickly, thoroughly, and economically than the non-expert library client could, and (2) by providing published information on which the employee can build without duplicating prior work."

A CASE STUDY IN ADDING INTELLECTUAL VALUE: THE EXECUTIVE INFORMATION SERVICE

Ann W. Talcott
Library Management Consultant
Short Hills, NJ

One executive calculates that his average daily mail contains 300 pages of material, not including technical journals. At the rate studies have shown human beings can absorb information--150 bits per second--those 300 pages would take eight hours to digest.[1] His experience is typical of executives in the "Information Age."

The case study presented here shows how executives and research scientists at one high-tech Fortune 500 company ("High-Tech Inc.") get expert help to cope with information overload--with selecting, analyzing, and packaging information, with having options presented, and with decision making.

COMPANY BACKGROUND

High-Tech Inc. has an active library organization that excels at providing scientific, technical, and business information to its scientists and engineers and holds major collections in the firm's primary subjects and in management. The professional staff have technical backgrounds as well as master's degrees in library science. The library produces current awareness publications that alert customers to new papers in technical subjects and management and to developments in important markets.

INTERNAL INFORMATION ENVIRONMENT

High-Tech's internationally known scientists and executives are very demanding library clientele. The technical staff want definitive, relevant, and complete information--historical as well as current. The executives rely heavily on "value-added" data, analytical summaries that present options or recommendations. What's happening today is critical for them. And they are always in a hurry for answers.

Information overload is a problem for both types of library clients. To help them cope, the library formed the Executive Information Service. Staffed by John Infoman, the Executive

Information Service is a one-stop information service that directly provides technical and business information in an analyzed, evaluated form. With graduate work in chemistry, a master's degree in library science, and a Chemical Information Specialist certificate, Infoman began in the library as a reference librarian, rapidly building a large and devoted clientele. His service instincts and acquisitive nature led him to develop, on his own time and with his own resources, clipping files on topics which he (rightly) guessed would be useful to executives. He initiated a selective dissemination of information service to several executives after noticing their interest in a topic. Recognizing his understanding of their research, technical clients turned more and more to Infoman for advanced information assistance. Gradually, service to executives and to chemists required Infoman's full attention, leading to the formation of the Executive Information Service.

CASE STUDIES OF EIS VALUE-ADDED SERVICE

The following are representative examples of the type of work Infoman provides to his clients.

The Corporate Profile

Mr. Veep, the vice president of a development division, will leave in two weeks for the Far East to visit six companies. Since he will meet influential executives and represent the company on important matters, background information on these companies is essential. His secretary calls Infoman. Infoman interviews her to learn the purpose and emphasis of the visit, who Mr. Veep will see, and the deadline for delivery of the information.

Recalling that he had clipped and saved recent articles on several of the companies for his files, Infoman begins his research there. He then searches for articles in the appropriate databases, using his knowledge of the sources and his understanding of the business to cull the most useful articles. He downloads the information into a file on his personal computer. Voluminous information exists on five of the companies; very little is found about the sixth.

For each company, Infoman determines the subjects which must be covered in the report. He synthesizes all the information and writes a five-to-ten page profile of the company, including its corporate mission, marketing strategy, research and development

activities, key financial data and ratios, and biographies of key officers. Spreadsheets are created using Lotus 1-2-3. Since Mr. Veep is particularly interested in research and development, Infoman expands that section of each profile. He creates a graph showing net income and research and development expenditures for the past five years and a table comparing past years' net sales, net income, R&D expenses, R&D expenses as a percentage of sales, R&D as a percentage of pre-tax profits, total employees, and R&D dollars per employee. He converts the foreign currencies into U.S. dollars. When he finds different amounts given for the 1983 R&D expenditures in two different articles, he evaluates the sources, compares other financial data for 1983 as well as the amounts spent on R&D in 1982 and 1984, and decides which amount is the most reasonable.

For the company on which there is little published information, Infoman contacts the nearest consulate to learn what he can. He also examines the reports of previous visits made by company employees and gleans some data. All this is summarized in two pages.

As each profile is completed, it is delivered to the client.

Infoman prioritizes five background articles on the industry into "must read" and "read if you have time" categories, delivering them with the last of the corporate profiles to the vice president's office on the due date.

Conference Attendance Decision

Several world-renowned members of the technical staff have been invited to a conference in a foreign country. Since this is only the second conference in the series and no one from the company has attended before, the president wonders if it is worthwhile. The deadline for registration is in two days. Infoman is contacted for help with the decision.

He searches on-line databases for citations from the conference. He calls these authors, several faculty members in this discipline at prominent universities, and a subject expert in the Department of Commerce, discreetly inquiring about the conference. He also interviews the executive director of the professional association in the subject area. Infoman composes a short report based on these conversations to management recommending that the scientists not attend the conference.

Recommended Method for Making a Compound

Ms. Molecular, a senior research chemist, contacts Infoman for recommendations on the best way to make a compound. After interviewing her to determine the core of the problem, Infoman combines his knowledge of chemistry with his expertise in information sources. He searches the literature (both print and on-line sources), finding several methods. He determines the criteria for evaluating the options (e.g., ease of preparation, best yield, toxicity of reaction materials) and rank orders the methods. The client continues working in the lab until the information is ready. Meeting with Infoman, Ms. Molecular quickly chooses the recommended method.

CLIENT REACTION TO THE SERVICE

Infoman's clients describe him as a unique, indispensable resource. (See Exhibit 1 for a list of his qualities.) They place the highest value on his ability to identify and obtain information crucial to them; to understand their targets quickly; to sift out the gems, condense, refine, analyze, and draw conclusions. His understanding of the business and knowledge of the company are essential.

Infoman's service closes the loop of the open continuum of Taylor's "value-added spectrum."[2] Infoman is pro-active. Capitalizing on his experience and expertise, he anticipates needs. He has an intuition and knowledge of the sources most likely to provide the information. He retains/collects information with (what he thinks will be) lasting value and brings it out again as needed (the phenomenon of reuse). His astounding memory is a great asset.

Infoman's interest is crucial. He plays an active role, not a passive one. He puts himself on the decision-making/problem-solving team. As the user involves him in the project closely, Infoman uses his judgment to provide feedback on the decision itself--which helps the decision maker make a better decision, analogous to the theory of participative management (when a factory worker has increased input into the design or manufacturing process, his/her interest grows; as interest grows, so does the quality of the product).

One client likens Infoman to the chess grandmaster in a Herbert Simon study on cognition. Simon researched how people solve problems or make decisions, using the example of the chess player. The chess player doesn't so much solve problems on the

Exhibit 1

CHARACTERISTICS OF THE SUCCESSFUL INFORMATION PROFESSIONAL

Understanding of the business; knowledge of the company (including corporate culture)

Intuitive feeling of what the client is looking for without his/her articulating it

Expert knowledge of the most productive sources to pursue for the information, whether on-line (full-text versus abstracts) or print

Ability to determine the most effective packaging: summarize, highlight essence of articles, prioritize articles (e.g., "must read," "read if you have time," "read if you have extra time"), prepare graphics, etc.

Ability to communicate effectively, whether to scientist, executive, or executive secretary; expert listener

Interest in his and his clients' work

Good memory

Strong commitment to quality service

Flexibility; ability to change direction and follow an unexpected path if it appears useful

Ability to work under pressure, with short deadlines

Ability to estimate what's possible, delivery schedules; not promise what you can't deliver

Ability to concentrate total effort for a short period of time on a project, finish it on schedule although he knows that more information may be available next week (post-deadline); drop a project when it's over (again, despite knowing that more information would be available if he had more time)

Ability to juggle several projects at once

Inquisitive; likes challenges, puzzles

Discreet

chess board as recognize positions. The chess grandmaster might know as many as 50,000 positions. Therefore, when he/she sees a position, he/she recognizes it, does not solve it as a problem. Infoman judges the value of different resources/paths to get information and the value of particular bits of information, thereby saving time and contributing quality. With his commitment, skill, and memory, he effectively stores patterns of information. He is also expert at creating new patterns when he encounters them.

This chess player model implies that the level of built-up experience is very important for the information professional. Novice through expert categories exist. It argues for routine activities being done by people who are learning. They advance with experience; however, they may never attain "grandmaster" status.

Excellent communications skills are essential. Requestors tend to be either too specific or too vague. Infoman is extremely effective in determining the heart of the issue, in refining the problem with the client. He is equally effective in communicating back to the client after the information is gathered.

The scientists emphasize the value of the depth of Infoman's subject knowledge and his knowledge of resources, especially on-line searching. They can rely on Infoman's results. His ability to understand the problem ensures that he won't limit his search for the answer too much or prune the results too drastically. In the words of one client, a poor search is not worth having; a search is either really good or worthless.

VISION OF THE FUTURE

The increasing tendency toward information overload requires a greater reliance on the people who form information into useful packages, i.e., information professionals. While technology is advancing in the activities that organize information (e.g., formatting, classifying), analysis, judgment, and decision making remain intensely human activities. They require intellectual effort. As Taylor writes, "Technology can provide the means for manipulating the data, can compare data and tell you which is higher or lower, and can inform you of the statistical significance level. But it cannot put the information together in meaningful ways in response to the needs of a person or a group of persons sitting in a particular situation with particular problems, be those problems well or ill-defined."[3]

The information professional provides information in the most expeditious manner possible, in a focused and meaningful way, packaged to meet the client's need. To be most valuable, the information professional must become an integral part of the research process, a member of the research team as well as of the executive suite. The clients of High-Tech Inc.'s Executive Information Service want a future where an information professional works in each technical organization.[4] A fully professional resource, the information specialist becomes an "information scout," providing users with information they didn't yet know they needed, and a "knowledge-based counselor," assisting the user in defining the problem, using expertise and experience to seek the solution, and adding intellectual value in the process.

Infoman and information professionals like him can alter the way the "Information Society" approaches work. Coping with information overload is their speciality--count them in on the future.

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THE IMPACT APPROACH: VALUE AS MEASURED BY THE BENEFIT OF THE INFORMATION PROFESSIONAL TO THE PARENT ORGANIZATION

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The value of an information professional can be defined as the benefits that he or she has brought to the parent organization, measured in terms of money or time saved, liability avoided, or a positive change in the course of action of the organization. We asked corporate information professionals, primarily in technical or research settings, for anecdotal evidence of the beneficial impact of one of their information staff on the overall organization. In all of the cases, a combination of factors contributed to the benefit, but the primary factor was the librarian or information professional. Summaries of some of the case studies follow.

A manufacturing company had a research team of three scientists and four technicians working on a project for one year, and they felt they had a patentable invention in addition to a new product. When they filed their invention disclosure form, the company's patent attorney requested a literature search from the technical librarian, prior to actually filing the patent application. While doing the search, the librarian found that the proposed application duplicated some of the work claimed in a patent that had been issued about a year before the team began its work. During the course of the project, the company had spent almost $500,000 on the project, an outlay that could have been avoided if they had spent the approximately $300 required to have the librarian review the literature before beginning the project.

A manufacturing company was negotiating with a contractor to produce the package for a new product about to be test marketed. The company's technical librarian, who was routinely scanning the Official Gazette of the U.S. Patent Office in order to produce a patent alerting bulletin, noticed that a patent had just been issued that was very similar to the design and function of the proposed new product package. A copy of the patent was obtained overnight and when delivered to the project team leader, it was determined that the contractor's package might infringe on this patent. The contractor was promptly informed of the issue by the project leader.

In the subsequent contract negotiations, the contractor changed the package design in order to avoid any possible infringement with the existing patent, and in addition, agreed to indemnify the manufacturing company should the company owning the patent sue for infringement. The manufacturer's patent attorney estimated that the librarian's attention and prompt action avoided about $20 million in possible damages and legal fees.

A petrochemical company was negotiating to acquire all the assets of the division of another company. During the negotiations, the acquiree furnished a list of patents as part of its statement of assets. The technical librarian was asked to review the list and in the subsequent patent search, determined that the acquiree had not furnished a complete list of the patents that it owned. Further, the missing patents were considered to be a significant portion of the patent protections for the technology that was considered to be a major segment of the acquiree's business. The company's attorneys used this information in the subsequent acquisition negotiations to obtain the rights to all the patents assigned to the acquiree, and hence full value for the purchase price.

We also found a simimlar example at another company where the company's technical librarian pointed out to the acquistions team that some of the patents shown on the statement of assets were not assigned or licensed to the company being acquired. The company's acquisition team promptly reduced the purchase price.

A manufacturing company was sued by an individual claiming that the company had stolen his "secret formula" for a product that the company had just marketed. An information scientist on the staff of the company's technical library found a reference in the technical literature that this formula was generally known to the trade long before the litigant developed his "secret formula". When presented with this fact, the litigant dropped his $7 million claim.

A food ingredient supplier discovered that the oil in the plastic packs of one of its products turned green. Engineers at the processing plant were unable to find the cause of the discoloration and came to the Technical Library for help. The Information Scientist suggested that the coloring agent in the frying oil might be the cause of the problem. The supplier was contacted and denied that the color was unstable. A search of a computer database costing $11 found that the color component was indeed unstable in both hot and cold temperatures. In fact, published work by the supplier noted this color instability. The engineers estimated that the Information Scientist's contributions saved about 200 hours of laboratory work.

A food ingredient supplier had a large shipment of poppy seed seized by Customs when going into Singapore Harbor. The Custom officials contended that the poppy seed was adulterated with morphine and codeine. According to experts at the supplier's headquarters, all the drug material, such as morphine, etc., was found in the pod of the poppy, not in the seed. Since they lacked evidence to prove this fact, they asked the Information Scientist on the technical library staff to do a literature search. The Information Scientist found a report from a USDA laboratory which showed that very small amounts of morphine and codeine -- 0.5 to 1.5 ppm -- occur naturally in poppy seed pods. These results were telexed to the Customs agents in Singapore who promptly released the shipment -- saving the costs of a duplicate shipment of poppy seed and the lab work to determine whether or not the product was adulterated.

A manufacturing company had a major project underway with a project team of 10 scientists and 12 technicians. The team had developed a novel product and was about to finalize its manufacturing process, prior to test marketing the product. The team was dismayed to learn that a patent had just been issued for a piece of machinery that included a claim for a component that was very similar to one of the components in the machinery used in the team's manufacturing process. The project leader came to the Technical Library to seek assistance from the Information Scientist. After an extensive patent review of similar devices, the Information Scientist found a patent where the body of the patent disclosed the information that was claimed by the recently issued patent. Since this patent had been issued well before the recent patent had even been applied for, the recent patent's claim was invalidated. The team proceeded with the development effort without having to spend time to work around the recent patent, bringing the product to test market on schedule.

The technical librarian for an electronics firm was asked to do a literature search for one of its engineers. During the course of the search interview, the engineer mentioned that 4 people had been working to resolve the problem at hand for more than a year. The technical librarian conducted the literature search and found an article that contained the answer the engineer needed to solve his problem. This article had been published several years before the time when the project team had begun its work. Had the engineer consulted the technical librarian when the problem was first identified, the company could have saved 4 man-years of labor with its resulting direct monetary costs.

An engineering consulting firm was bidding on a $75 million contract from a pulp and paper company. The corporate library staff was asked to assist in preparing the contract proposal by gathering and evaluating financial information about the company and the industry. After analyzing the reports gathered during a computer literature search on the pulp company's finances, plants, and products, as well as forecasts of industry demand and capacity, they learned that the company's capital investment cycle differed significantly from the rest of the industry. This fact was the basis of the financial section for the consulting firm's proposal and ultimately led to the contract award.

APPENDIX

APPENDIX

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